2013 CIE Review of Non-Target Species Stock Assessments in the BSAI and GOA

Executive Summary

CIE Reviewers: Dr. Matthew Cieri, Maine Department of Marine Resources

Dr. Patrick Cordue, Innovative Solutions Ltd, Wellington & Wairarapa, New Zealand

Dr. Jon Helge Volstad, Institute of Marine Research, Bergen, Norway

Appended documents: CIE Review Meeting Agenda, Independent review report by each author

Chronology:

Staff at the AFSC requested a review of assessment methods for non-target species in fall 2012. Reviewers were selected by the Center for Independent Experts in March 2013 and the review meeting was held at the AFSC in Seattle on May 28-30, 2013. Non-target assemblages included in this review were: sculpins, skates, sharks, squid, octopus, and grenadier; both the BSAI and GOA management areas were included for each assemblage. SAFE reports for each assemblage and supporting documentation were provided to reviewers and participants via a public website. Conferencing technology (Webex) was used to allow participation of agency and council staff and interested industry participants in Juneau and Auke Bay, AK. On the first day of the session presentations were made on data sources and concepts common to all assessments, including: GOA, BS shelf, BS slope, and AI bottom trawl surveys, longline survey, catch accounting by the AK region, FMA observer program catch data and otolith collection, aging procedures and data for non-target species groups, use of smoothing algorithms for biomass time series, and models used in the North Pacific Council's Tier 5. On the following two days reviewers heard presentations from the assessment author for each assemblage, followed by discussion. At the conclusion of the review presentations were made of additional information requested during the proceedings and follow-up interviews by telephone were arranged to cover additional questions. Discussions among the three reviewers were held throughout the meeting, but each reviewer prepared his report independently. AFSC received the reports on July 9, 2013, and reports were distributed to assessment authors and review participants July 12, 2013. The reports are being distributed to plan team and SSC members in September 2013.

Terms of Reference:

The reviewers were asked to respond to the following terms of reference:

1. Evaluation of data used in the assessments, specifically trawl and longline survey abundance estimates, survey indices and recommendations for processing data for use in assessments, and whether available age data should be used in the assessments.

2. Evaluation of analytical methods presently used in Tier 5 assessments. Evaluation may include: methods for estimating natural mortality (M), alternative biomass estimates (e.g. Kalman filter and survey biomass averaging, and consumption-based models.

3. Evaluation, findings and recommendations on the analytic approach used for "data-poor" stocks that have no reliable estimate of biomass, specifically, Tier 6 species/stock complexes.

4. Review of the grenadier assessment and the reliability of the estimation of biomass.

5. Review age information that is available for a number of the Alaska "non-target" species, including spiny dogfish, giant grenadier, yellow Irish lord, great sculpin, and plain sculpin. Age of maturity information is also available for giant grenadier. Although the ages have not been validated, use of these age data in the assessment process could result in moving these species to a higher assessment tier. Provide recommendations on how to proceed with the age data.

6. Recommendations for further improvements

Summary of Meeting Discussion and Reviewer Responses:

Each reviewer provided an individual report with responses to the TORs and additional comments (see attached). The reports are very different, and each reviewer focused on different areas. Two responses were discussed extensively during the meeting and are addressed in all three reports.

All three of the reviewers expressed difficulties with using trawl survey biomass as an estimate of absolute abundance for the Tier 5 model. All of the reviewers felt that the trawl surveys were properly designed and well conducted. However, the reviewers all felt that there were important factors that weigh against trawl survey biomass as an estimate of absolute abundance. Chief among these concerns is the assumption of 100% trawl efficiency (q=1). The reviewers cited many reasons why this assumption could be invalid. Reviewers also pointed out that a trawl survey may not cover the entire distribution of a stock, either because the survey covers only a portion of the geographical range of a stock or because trawl gear cannot sample in all of the habitats occupied by the stock. The extrapolation of observed trawl survey densities to untrawlable ground was of particular concern, especially in the Aleutian Islands. Dr. Cordue provides detailed discussion and a suggested procedure for converting a relative trawl survey index to absolute biomass.

All three of the reviewers also cited difficulties with the Tier 5 model as it is codified for North Pacific stock assessments. The primary criticism was against the use of the constant buffer between OFL and ABC that is specified in both Tiers 5 and 6. Reviewers recommended that this buffer should be variable between assessments, and dependent on the level of uncertainty within the assessment method. There was extensive discussion of what constitutes a "reliable" biomass estimate, especially given issues with survey biomass (see above). While the reviewers were generally in accordance with procedures used for estimating natural mortality rates, Dr. Cordue objected to the fixed use of $M*B$ as the most appropriate reference point for all stocks. He suggests that species-specific simulation models be used to derive better reference points, and provides an example of such a model for octopus.

Other areas of general agreement included the use of smoothing algorithms for biomass time series and the utility of age data in the non-target species assessments. The reviewers discouraged the practice of averaging the most recent three surveys to form an estimate of long-term average biomass, especially when the time period covered by the surveys exceeded the expected life span of the species. All three

reviewers were more supportive of the use of a Kalman filter or other smoothing algorithm to estimate long-term average biomass. While the reviewers generally felt that the procedures used for aging were appropriate, they suggested the use of outside laboratories as an additional quality control step for non-target species less familiar to AFSC readers.

An additional issue regarding which all three reviewers expressed their dissatisfaction is our use of "precautionary science" and "conservative" estimates in the face of uncertainty. For example, Cordue's report (page 4) discusses the fact that we sometimes justify actions based on whether or not it is conservative, rather than whether it is the single best estimate. Many of the general comments described above also pertain to this concern, e.g. assuming survey q=1 likely results in an underestimate (or"conservative" estimate) of abundance. The use of conservative estimates of M was also thought to overly precautionary. The reviewers also commented that management concerns rather than best available science appeared to influence some of the decisions the NPFMC has taken regarding nontargets.

Other comments and species-specific suggestions varied between the three reviewers. The Tier 3 model for Alaskan skate was determined to be in need of further development. Suggestions were made for adding randomly-selected station to the longline survey to make it more representative, and changes to otolith sampling methods were suggested to get more spatially representative estimates of age distribution for non-target species. More integration of State of Alaska fishery data was encouraged, along with cross-checks between different surveys and data sources. One reviewer proposed modifications to the consumption method used for BSAI octopus, while another recommended that it not be used. Two reviewers agreed that Tier 6 (with some modification of time periods) was appropriate for both squid and sharks, while the third felt that historical catch data "should be used as a method of last resort".

All of the reviewers commented favorably on the effort that the NPFMC and AFSC have put into assessing non-target species, and the efforts of assessment authors to produce scientifically credible benchmarks under extremely difficult conditions. The non-target species assessment authors have been provided with the review reports and will incorporate assessment-specific responses to the review into upcoming and future stock assessments. These reports are also being provided to the Plan Teams and SSC for review of comments on Tier 5 and 6 methodology.